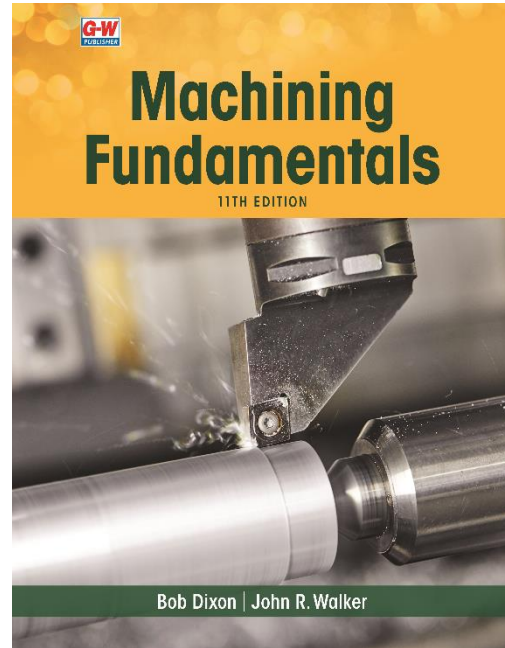




Correlation of
***Machining Fundamentals*, Dixon and Walker**
(Goodheart-Willcox Publisher ©2023)
to
NIMS KSAOs

The following chart correlates the NIMS knowledge areas, skills, abilities, and other characteristics (KSAOs) to the *Machining Fundamentals* textbook. The basic skills listed below are correlated by chapter and page numbers.



Level I Knowledge Areas, Skills, Abilities, and Other Characteristics

KSAO Basic Skills	G-W Content
KSAO Area 1. Written and Oral Communications	
KSAO 1.1: Reading Locates, understands, and interprets written technical and nontechnical information in documents commonly found in the metalworking industry. These documents contain short and simple sentences, paragraphs and passages, phrases, quantitative information, specialized vocabulary, graphs, charts, schedules, simple instructions, and multistep directions. All documents are written in standard English.	Textbook: Chapter 4, pg. 41–56 Reference Section: Textbook pg. 609–643

KSAO Basic Skills	G-W Content
<p>KSAO 1.2: Writing</p> <p>Communicates technical and nontechnical information, messages, and ideas in writing using standard English commonly found in the metalworking industry. This writing includes the completion of forms, information sheets, reports, group meeting materials, and short memos.</p>	<p>Textbook: Chapter 2, pg. 22–26; Chapter 6, pg. 94; Chapter 9, pg. 153</p>
<p>KSAO 1.3: Speaking</p> <p>Communicates technical and nontechnical detailed information, messages, multistep directions and ideas through oral communication using standard English and related cues and communication aids in conversations, discussions, and group meetings. Understands and responds to listener feedback and asks questions when needed in two-way and group conversations.</p>	<p>Textbook: Chapter 2, pg. 22–26; Chapter 9, pg. 153; Chapter 16, pg. 281</p> <p>Lesson Plans: Chapter 33</p>
<p>KSAO 1.4: Listening</p> <p>Listens for, receives, interprets, and recalls specific details, ideas, and multistep instructions in verbal presentations, conversations, discussions, and group meetings conducted in standard English and supported by written materials and other communication cues and aids. Uses active listening skills in comprehending simple technical and nontechnical verbal information.</p>	<p>Textbook: Chapter 16, pg. 281</p> <p>Lesson Plans: Chapters 2 and 3</p>
KSAO Area 2. Mathematics	
<p>KSAO 2.1: Arithmetic</p> <p>Performs addition, subtraction, multiplication, and division of whole numbers without a calculator, and performs calculation of fractions and decimals, as well as conversion to metric measurement with or without a calculator.</p>	<p>Textbook: Chapter 5, pg. 60–69</p> <p>Math Review: Textbook pg. 587–592</p>
<p>KSAO 2.2: Applications of Geometry</p> <p>Understands and applies basic geometric concepts and terminology which form the analytical foundation of job planning and execution including planes perpendicularity, Cartesian coordinates, concentricity, parallelism, straightness, flatness, circularity, and symmetry, etc.</p>	<p>Textbook: Chapter 6, pg. 84–95; Chapter 21, pg. 408–409; Chapter 27, pg. 484–496</p> <p>Math Review: Textbook pg. 596–600</p>
<p>KSAO 2.3: Applications in Algebra</p> <p>Uses standard formulas and arithmetic operations to make required calculations with or without a calculator. Can solve for an unknown in a trade formula.</p>	<p>Textbook: Chapter 12, pg. 188–189; Chapter 14, pg. 23–240; Chapter 16, pg. 275–276, 282, 287–288; Chapter 18, pg. 342–345</p> <p>Math Review: Textbook pg. 596, 601, 604–608</p> <p>Reference Section: Textbook pg. 623–624</p>

KSAO Basic Skills	G-W Content
<p>KSAO 2.4: Applications in Trigonometry Uses standard formulas and arithmetic operations to make required calculations with or without a calculator, solving for unknowns in right triangles.</p>	<p>Textbook: Chapter 18, pg. 346–349 Math Review: Textbook pg. 601 Reference Section: Textbook pg. 623–624</p>
<p>KSAO 2.5: Applications of Statistics Uses standard formulas and arithmetic operations to calculate means, medians, modes, and ranges with or without a calculator.</p>	<p>Textbook: Chapter 26, pg. 470–471 Math Review: Textbook pg. 602</p>
<p>KSAO Area 3. Decision Making and Problem Solving</p>	
<p>KSAO 3.1: Applying Decision Rules Can follow a set of instructions laid out in a sequence. Can interpret and follow "if... then..." instructions.</p>	<p>Textbook: Chapter 6, pg. 92–95; Chapter 8, pg. 147; Chapter 12, pg. 189–199; Chapter 16, pg. 276–279, 286; Chapter 18, pg. 324–330, 332–336, 340–349; Chapter 19, pg. 363–365, 367–372; Chapter 20, pg. 385–389, 393–394; Chapter 29, pg. 519–521</p>
<p>KSAO 3.2: Basic Problem Solving Can establish new responses to unexpected problems of a simple nature. Can formulate the new responses into a sequence of instructions or a set of "if ... then ..." rules.</p>	<p>Textbook: Chapter 12, pg. 194; Chapter 14, pg. 221–227; Chapter 19, pg. 366–367; Chapter 20, pg. 393–394; Chapter 33, pg. 567–572</p>
<p>KSAO Area 4. Social Skills and Personal Qualities</p>	
<p>KSAO 4.1: Social Skills Identify and demonstrate the appropriate social skills and related personal qualities in the performance of major duties requiring cooperative relations with supervisors, team leaders, and team members.</p>	<p>Textbook: Chapter 2, pg. 22–26; Chapter 14, pg. 221; Chapter 16, pg. 281; Chapter 27, pg. 484</p>
<p>KSAO 4.2: Personal Qualities Identify and demonstrate the appropriate personal qualities in performing major job duties and maintaining positive employment relations.</p>	<p>Textbook: Chapter 2, pg. 22–26; Chapter 13, pg. 211; Chapter 14, pg. 221; Chapter 16, pg. 281; Chapter 23, pg. 433</p>
<p>KSAO Area 5. Engineering Drawings and Sketches</p>	
<p>KSAO 5.1: Standard Orthographic Prints Interprets orthographic blueprints.</p>	<p>Textbook: Chapter 4, pg. 41–56; Chapter 27, pg. 483–496</p>
<p>KSAO 5.2: GDT Orthographic Prints Interprets GDT orthographic prints.</p>	<p>Textbook: Chapter 27, pg. 483–496</p>
<p>KSAO 5.3: Datums, Symbolology, and Tolerances Identify the common symbols, the use of datum references and tolerances used in GD&T.</p>	<p>Textbook: Chapter 4, pg. 41–50; Chapter 27, pg. 483–496 Reference Section: Textbook pg. 643</p>

KSAO Basic Skills	G-W Content
KSAO Area 6. Measurements	
<p>KSAO 6.1: Basic Measuring Instruments Recognizes and applies basic measuring instruments such as rules, protractors, and basic transfer tools such as simple inside and outside calipers.</p>	<p>Textbook: Chapter 5, pg. 57–60, 77–80; Chapter 6, pg. 84–87, 91–92 Math Review: Textbook pg. 590–591</p>
<p>KSAO 6.2: Precision Measuring Instruments Recognizes and applies precision measuring instruments such as micrometers, vernier, dial, and electronic calipers, dial indicators, precision transfer tools such as telescoping gages and adjustable parallels.</p>	<p>Textbook: Chapter 5, pg. 60–80 Math Review: Textbook pg. 592–596</p>
<p>KSAO 6.3: Surface Plate Instruments Recognizes and applies appropriately precision tools and instruments for surface plate work such as precision angle plates and tool blocks, precision transfer gages, and precision height gages.</p>	<p>Textbook: Chapter 5, pg. 69–80; Chapter 6, pg. 84–92</p>
<p>KSAO 6.4: Metric Conversion Convert all measurements to metrics.</p>	<p>Textbook: Chapter 5, pg. 58–62 Reference Section: Textbook pg. 632–633</p>
KSAO Area 7. Metalworking Theory	
<p>KSAO 7.1: Cutting Theory Understands and can explain the ideas of heat, shock, friction, zone of distortion, cutting interface, machinability, cutter presentation, cutter geometry, and chip-holding capacity as they relate to machining applications.</p>	<p>Textbook: Chapter 10, pg. 156–161; Chapter 11, pg. 162–172; Chapter 12, pg. 177–182, 188–196; Chapter 14, pg. 242–252; Chapter 15, pg. 253–260; Chapter 17, pg. 301–314; Chapter 18, pg. 324–341</p>
<p>KSAO 7.2: Tooling Recognizes a wide variety of cutting tools, tool holding devices, and work-holding devices. Understands the appropriate application of these cutters and devices.</p>	<p>Textbook: Chapter 12, pg. 177–188; Chapter 14, pg. 221–237; Chapter 15, pg. 254–266; Chapter 17, pg. 301–313; Chapter 18, pg. 324–341; Chapter 19, pg. 357–362; Chapter 20, pg. 383–385</p>
<p>KSAO 7.3: Material Properties Recognizes common materials and their principal properties relevant to machining tasks. Recognizes differences between ferrous and nonferrous, magnetic, and ductile materials. Understands the changes which heat-treat impart to materials.</p>	<p>Textbook: Chapter 28, pg. 497–512; Chapter 29, pg. 513–531 Reference Section: Textbook pg. 612–613</p>
<p>KSAO 7.4: Machine Tools Recognizes the common classes of machine tools, understands the function of the major subsystems of the machine tools, selects and applies a given machine tool appropriately.</p>	<p>Textbook: Chapter 11, pg. 162–170; Chapter 12, pg. 173–177; Chapter 13, pg. 206–212; Chapter 14, pg. 215–219; Chapter 15, pg. 265–266; Chapter 17, 294–301; Chapter 18, pg. 323–341; Chapter 19, pg. 355–358; Chapter 20, pg. 381–385, 393–397; Chapter 21, pg. 402–407</p>

KSAO Basic Skills	G-W Content
<p>KSAO 7.5: Cutting Fluids and Coolants Recognizes, selects, and applies appropriate coolants and coolant delivery systems.</p>	<p>Textbook: Chapter 10, pg. 156–161; Chapter 12, pg. 189; Chapter 13, pg. 211–212; Chapter 17, pg. 314–315; Chapter 19, pg. 362–363 Reference Section: Textbook pg. 638</p>
<p>KSAO Area 8. Introduction to CNC</p>	
<p>KSAO 8.1: Word Address Program Codes Develop a knowledge of basic word address programming codes, and Cartesian Coordinates Understand incremental and absolute positioning and cutter compensation.</p>	<p>Textbook: Chapter 21, pg. 408–412; Chapter 22, pg. 414–428; Chapter 23, pg. 429–436; Chapter 24, pg. 444–451 Reference Section: Textbook pg. 639–641</p>